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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/694,172

10/28/2003

Kazuyoshi Ueno

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EXAMINER

TSOY, ELENA

ART UNIT

PAPER NUMBER

1792

MAIL DATE

DELIVERY MODE

06/26/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/694,172	Applicant(s) UENO ET AL.	
	Examiner Elena Tsoy	Art Unit 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 April 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5,7 and 9-20 is/are pending in the application.
- 4a) Of the above claim(s) 1-5 and 12-17 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 7,9-11 and 18-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
 If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

Response to Amendment

Amendment filed on June 6, 2008 has been entered. New claim 20 has been added. Claims 1-5, 7, 9-20 are pending in the application. Claims 1-5, 12-17 are withdrawn from consideration as directed to a non-elected invention.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 7, 9, and 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al (US 6180523) in view of Sambucetti et al (US 6335104).

Lee et al in view of Sambucetti et al is applied here for the same reasons as set forth in paragraph 2 of the Office Action mailed on 11/20/2007.

As to Amendment of claim 7, Lee et al teaches that their invention discloses a technique of utilizing electroless deposition in USLI circuits. This metalization process is an additive and selective to provide **conducting layers** as well as an interconnection between layers of a **multilevel** conductive metal semiconductor device. See column 10, lines 60-62; Abstract; column 5, lines 41-45; column 2, lines 9-12.

As to claim 20, Lee et al teaches that the invention provides three embodiments for forming **Cu/Au** contacts and interconnects using electroless deposition (See Abstract).

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3. Claims 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al in view of Sambucetti et al, further in view of Neary (US 4424805) and Vullaume et al (Applied Physics Letters, vol. 69, pages 1646-1648, 1996) described by Wada et al (US 20050056828) for the reasons discussed above and for the reasons of record set forth in paragraph 10 of the Office Action mailed on 5/31/2007.

4. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al in view of Sambucetti et al, further in view of Sliwa (US 4990462) for the reasons of record set forth in paragraph 4 of the Office Action mailed on 11/20/2007.

Response to Arguments

5. Applicant's arguments filed April 21, 2008 have been fully considered but they are not persuasive.

I. Rejection over Lee in view of Sambucetti et al

(A) Applicants submit that instant claim 7, from which all remaining pending claims depend, is directed toward a USLI having a multilayered wiring structure. As such, a diffusion prevention layer must be formed around the wiring which is buried within the first insulating layer. Such a diffusion prevention layer aids in preventing metal elements of the wiring layer from being diffused into the first insulating layer, and serves to form a wiring structure. This feature is nowhere disclosed in the combination of Lee and Sambucetti et al. Lee nowhere teaches or suggest the first barrier layer being made of a plating film selected from the claimed components. Further, Sambucetti et al merely discloses a flat Cu pad having a barrier layer. Sambucetti et al's simple copper pad is configured in one plane, and thus also faces simpler technical problems than the instantly claimed multilayered structure. Certainly Sambucetti nowhere requires the formation of a barrier layer (that serves as a wiring structure), formed around a wiring layer, that is buried within in the first insulating layer. Thus, at least because Sambucetti does not suggest the features of instant claim 7, 9, 18 and 19 (i.e., formation of a diffusion prevention layer that forms the wiring structure), it would not have been obvious to have combined Sambucetti with Lee to arrive at the features of those claims.

The Examiner respectfully disagrees with this argument. Sambucetti is a *secondary* reference which is relied upon to show that a diffusion barrier layer 16 of a metal alloy material such as a phosphorus or boron-containing alloy of Ni-P, Co-W-P, Co-Sn-P, **Ni-W-P**, Co-B, Ni-B, Co-Sn-B, Co-W-B and Ni-W-B *is suitable* for prevention of *copper diffusion* (See FIG. 1; column 5, line 61 to column 6, line 18). It is held that **the selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination.** Sinclair & Carroll Co. v. Interchemical Corp., 325 U.S. 327, 65 USPQ 297 (1945). See MPEP 2144.07. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used Ni--W--P as a diffusion prevention film in Lee et al with the expectation of providing the desired prevention of the first Cu layer from diffusing since Sambucetti et al teach that an electroless Ni-B film or Ni--W--P film is suitable for preventing Cu from diffusion, and Lee et al do not limit their teaching to particular Ni alloys.

Note also that Ni-W-P would prevent *copper diffusion* whether a copper pad is in flat shape or not.

II. Other Art Rejections

The Office Action rejects claims 9-11 under 35 U.S.C. § 103(a) as being unpatentable over Lee in view of Sambucetti et al, further in view of Neary (U.S. Patent No. 4,424,805) and Vullaume et al (Applied Physics Letters, vol. 69, pages 1646-48, 1996), as described by Wada et al (U.S. Patent Appln. Pub. No. 2005/0056828); and rejects claim 18 under 35 U.S.C. § 103(a) as being unpatentable over Lee in view of Sambucetti et al, further in view of Silwa (U.S. Patent No. 4,990,462). Applicants respectfully traverse these rejections. The foregoing rejections rely upon the improper rejection of instant claims 7, 9, 18 and 19 over the combination of Lee and Sambucetti et al. For the reasons discussed above, these rejections are thus moot.

The Examiner respectfully disagrees with this argument for the reasons discussed above.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elena Tsoy whose telephone number is 571-272-1429. The examiner can normally be reached on Monday-Friday, 9:00AM - 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on 571-272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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Elena Tsoy, Ph.D.
Primary Examiner
Art Unit 1792

June 28, 2008

/Elena Tsoy /

Primary Examiner, Art Unit 1792